Toxic Industrial Chemicals/Toxic Industrial Materials (TICS/TIMs) – Awareness and Preventive Measures

For Service Members

Important Facts

- Historically, military chemical hazards of concern on battlefields were limited to chemical warfare agents (CWA).
- Today, many toxic industrial chemicals/toxic industrial materials or "TICs/TIMs" could be used as weapons.
- Insurgents in Iraq have combined TICs such as chlorine gas with Improvised Explosive Devices (IEDs) to create attacks having both a blast and chemical hazard.
- Military protective masks (M40/MCU-2A/P protective masks) while designed for protection against certain chemical, biological, radiological, and nuclear warfare agents, may also afford protection against some TICs/TIMs. However, unless directed otherwise, they should only be used as escape devices.

What are Toxic Industrial Chemicals and Toxic Industrial Materials (TICs/TIMs)?

Toxic industrial chemicals (TICs) include chemicals manufactured for use in industrial, commercial, or medical

processes. TICs/TIMs can be in gas, liquid, or solid form (include particles), though those of particular concern tend to be gases because gas spreads easily. Some common TICs include: ammonia, chlorine, and hydrogen cyanide. (More detailed list of TICs, USACHPPM, http://chppm-www.apgea.army.mil/chemicalagent/PDFFiles/TICRepsonseCharts.pdf) Exposures to TICs via IEDs primarily occur from vapors that affect the eyes, nose, throat and lungs. TIMs refers to TICs or non-chemical commercial/industrial materials that may be used as weapons; for example, radioactive materials which could be found in a dirty bomb.

How can I be exposed to TICs or TIMs?

Exposures to TICs/TIMs can result from accidental releases, collateral damage from explosions/attacks near stored chemicals, or intentional dispersion with explosives such as IEDs. Insurgents in Iraq have used chlorine gas tanks packaged with IEDs.

TICs/TIMs of concern can be found almost anywhere, but primarily in: chemical plants, industrial manufacturing facilities, waste water treatment plants, chemical/waste storage facilities/landfills, laboratory settings, large fuel storage areas, and at major transportation centers including the vehicles (trains, barges, etc.).

What are the potential health effects from exposure to TICs/TIMs?

Health effects can vary and depend on the type of chemical/material, how it enters your body, the amount, and how long you were exposed. Some bodies may have unique reactions to certain TIC/TIMs and some may have no reaction at all. Potential symptoms of exposure include immediate or short–term (acute) health effects: coughing, difficulty breathing, and/or irritation of your nose, mouth, throat, eyes, or skin. Acute exposure to certain TIC/TIMs at high dosage(s) can case death.

Long-term (chronic) effects from single or brief exposures are less likely but can occur (especially if the dose was high and/or repeated). Potential chronic effects that may be associated with certain TIC/TIM exposures (e.g., asthma, cancer) may take years to develop. It is generally difficult link a specific or single TIC/TIM exposure to illnesses experienced in the long–term. Many other life factors result in these types of symptoms and health effects.

How do I protect myself from the release of TICs/TIMs?

The best defense is to be on the look out for TIC/TIM hazards and to avoid exposure when possible. Current military detectors and protection systems are not generally adequate to quickly detect commercial chemicals in the event of a release in a deployed setting. Should the release of TICs/TIMs occur, quickly follow command-issued guidance.

What should I do if an attack or release occurs and gas or vapors are present (for example, unusual odor or visible cloud)?

When in doubt, MASK and quickly MOVE as far upwind as possible, using the M40 or MCU-2A/P-protective masks and avoiding contact with liquid contaminated surfaces when possible.

- When safe – evaluate need to decontaminate your eyes, skin or clothing
- If your eyes or skin are contaminated and especially if they feel like they are burning or show signs of irritation, immediately flush with large amounts of water
  - Carefully remove and dispose of contaminated clothing
  - Replace the canister (C2A1) on protective mask worn during the exposure event
- Seek medical treatment and evaluation for effects that resulted in burns or moderate to severe irritation, particularly if you have breathing difficulties. This could be a sign of more serious delayed effects
- Notify higher headquarters using unit standard operating procedure (SOP)

Note: The normal combat uniform provides general skin protection against some TIMs and against TIC vapors. However, if liquid or aerosol droplet hazards are present, they may penetrate the uniform and cause skin irritation or burns. Victims exposed **only to TIC vapors** who have no skin or eye irritation do not generally need to be decontaminated, though it may be prudent to change outer clothing.

What are the M40 and MCU-2A/P-Protective Masks?

M40 Protective Mask (Figure 1) for the U.S. Army and U.S. Marine Corps and MCU-2A/P (Figure 2) for the U.S. Air Force and U.S. Navy are currently the most commonly used protective masks. They were designed specifically to protect against traditional chemical and biological warfare agents. They provide some limited respiratory, eye, and face protection against other battlefield contaminants and some TICs/TIMs. Thus, for TIC/TIM exposures, they should be used as escape devices and not be used for prolonged protection.

Figure 1. M40 – Protective Mask with one C2A1 filter canister

Figure 2. MCU-2A/P – Protective Mask with C2A1 filter canister

Where Do I Get More Information?

DoD Deployment Health Clinical Center (DHCC)
Phone: (866) 559-1627
http://www.pdhealth.mil/

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM)
Phone: (800) 222-9698
http://chppm-www.apgea.army.mil

USACHPPM TIC/TIM Brochure:
http://chppm-www.apgea.army.mil/documents/Disaster/TICResponse2.pdf;

DoD Force Health Protection and Readiness (FHP & R)
Phone: (800) 497-6261
http://fhp.osd.mil

Navy Environmental Health Center (NEHC)
Phone: (757) 953-0700
http://www-nehc.med.navy.mil

USACHPPM TIC/TIM charts:
http://chppm-www.apgea.army.mil/chemicalagent/PDFFiles/TICRepsonseCharts.pdf.

Air Force Institute for Operational Health (AFIOH)
Phone: (888) 232-3764
http://www.brooks.af.mil/units/airforceinstituteforoperationalhealth/index.asp

Armed Forces Medical Intelligence Center (AFMIC)
Phone: (301) 619-7574
http://www.afmic.detrick.army.mil

OSHA
Phone: 1-800-321-OSHA (6742)
http://www.osha.gov/SLTC/emergencypreparedness/guides/chemical.html